

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY
LIMITED,
Petitioner,

v.

GODO KAISHA IP BRIDGE 1,
Patent Owner.

Case IPR2016-01264
Patent 6,538,324 B1

Before JUSTIN T. ARBES, MICHAEL J. FITZPATRICK, and
JENNIFER MEYER CHAGNON, *Administrative Patent Judges*.

FITZPATRICK, *Administrative Patent Judge*.

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Petitioner, Taiwan Semiconductor Manufacturing Company Limited, filed a Petition to institute an *inter partes* review of claims 1–3, 5–7, and 9 of U.S. Patent No. 6,538,324 B1 (Ex. 1001, “the ’324 patent”) pursuant to 35 U.S.C. § 311(a). Paper 2 (“Pet.”). Patent Owner, Godo Kaisha IP Bridge 1, filed a Preliminary Response under 35 U.S.C. § 313. Paper 6 (“Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314(b); 37 C.F.R. § 42.4(a). Upon consideration of the Petition and Preliminary Response, and for the reasons explained below, we determine that the information presented shows a reasonable likelihood that Petitioner would prevail with respect to at least one claim challenged in the Petition. *See* 35 U.S.C. § 314(a); 37 C.F.R. § 42.108. We institute an *inter partes* review.

A. Related Matters

Petitioner has filed a separate petition for an *inter partes* review of the ’324 patent, which petition challenges the same claims as the instant Petition. Pet. 52; Paper 4, 1; *see also* Case IPR2016-01249.

Patent Owner has asserted the ’324 patent in *Godo Kaisha IP Bridge 1 v. OmniVision Technologies, Inc.*, No. 1-16-cv-00290 (D. Del.) and *Godo Kaisha IP Bridge 1 v. Broadcom Ltd.*, No. 2-16-cv-00134 (E.D. Tex.). Pet. 51–52; Paper 4, 2.

B. The '324 Patent

The '324 patent “relates to a semiconductor integrated circuit including a copper wiring layer, and more particularly to a barrier film which prevents copper diffusion from such a copper wiring layer.”

Ex. 1001, 1:7–10. A primary problem in the prior art, as noted by the '324 patent, is that it was difficult to make a diffusion-barrier film that effectively prevents copper diffusion while also being sufficiently adhesive to copper. *Id.* at 2:58–61. According to the '324 patent, a crystalline metal film was known to provide “high adhesion” but poor prevention of copper diffusion. *Id.* at 3:14–20. On the other hand, it was known that an amorphous metal nitride film would provide a better barrier to copper diffusion since it “does not have the paths through which copper is diffused,” but it would suffer from poor adhesion to copper. *Id.* at 3:21–33.

The '324 patent describes a two-layered barrier film in which an amorphous metal nitride layer prevents copper diffusion and a crystalline metal layer containing nitrogen provides the desired adhesion. *Id.* at 5:1–8, 6:6–8.

C. The Challenged Claims

Of the challenged claims, claims 1 and 5 are independent. Claim 1 is illustrative and reproduced below.

1. A barrier film preventing diffusion of copper from a copper wiring layer formed on a semiconductor substrate, comprising a multi-layered structure of first and second films,
said first film being composed of crystalline metal containing nitrogen therein,

said second film being composed of amorphous metal nitride,

said barrier film being constituted of common metal atomic species,

said first film being formed on said second film,

said first film in direct contact with said second film,

said first film containing nitrogen in a smaller content than that of said second film.

D. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability:

References	Basis ¹	Claims
Zhang (Ex. 1004) ² and Ding (Ex. 1005) ³	§ 103(a)	1–3, 5–7, and 9
Zhang, Ding, and Sun (Ex. 1007) ⁴	§ 103(a)	1–3, 5–7, and 9

Pet. 20, 48.

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, took effect on March 18, 2013. Because the application from which the ’324 patent issued was filed before that date, our citations to 35 U.S.C. §§ 102 and 103 are to their pre-AIA versions.

² U.S. Patent No. 5,893,752 to Zhang, filed December 22, 1997, and issued April 13, 1999. On the record presented, Zhang is prior art under at least 35 U.S.C. § 102(a) and (e).

³ U.S. Patent No. 6,887,353 B1, filed December 19, 1997, and issued May 3, 2005. On the record presented, Ding is prior art under 35 U.S.C. § 102(e).

⁴ Sun et al., “Properties of reactively sputter-deposited Ta – N thin films,” *Thin Solid Films*, Vol. 236 (1993), pp. 347–351. On the record presented, Sun is prior art under at least 35 U.S.C. § 102(b).

II. ANALYSIS

A. Claim Construction

“A claim in an unexpired patent that will not expire before a final written decision is issued shall be given its broadest reasonable construction in light of the specification of the patent in which it appears.” 37 C.F.R. § 42.100(b). Pursuant to that standard, the claim language should be read in light of the specification, as it would be interpreted by one of ordinary skill in the art. *In re Suitco Surface, Inc.*, 603 F.3d 1255, 1260 (Fed. Cir. 2010). Thus, we generally give claim terms their ordinary and customary meaning. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007) (“The ordinary and customary meaning ‘is the meaning that the term would have to a person of ordinary skill in the art in question.’” (quoting *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc))).

Petitioner does not propose an express construction for any limitation, although it asserts that the broadest reasonable interpretation should be applied to all claim terms. Pet. 11. Patent Owner proposes express constructions for two limitations, as discussed below.

1. “*said first film being composed of crystalline metal containing nitrogen therein*”

Independent claims 1 and 5 each recite “said first film being composed of crystalline metal containing nitrogen therein.” Patent Owner proposes that this limitation be construed to mean “a first film is composed of a mixture of single crystalline or polycrystalline metal with nitrogen *throughout*.” Prelim. Resp. 13 (emphasis added). Thus, Patent Owner’s construction would require a first film that is of uniform composition. *See*,

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